



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB1998-0042

November 19, 1998

David P. Boergers, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: Endangered Species Act Section 7 Consultation for the
Enloe Hydroelectric Project (Project No. 10536)

Dear Secretary Boergers:


On May 11, 1998, the National Marine Fisheries Service (NMFS) received from the Federal Energy Regulatory Commission (Commission) a request for formal consultation on Upper Columbia River steelhead, listed as endangered pursuant to the Endangered Species Act (ESA), for issuance of a new Federal license for the Enloe Hydroelectric Project (Project). Enclosed is NMFS' biological opinion for the proposed action. The Commission determined that the subject action was not likely to jeopardize the continued existence of Upper Columbia River steelhead based on (1) the new license would ensure that the Project is compatible with any future plans to provide fish passage thus contributing to the enhancement and recovery of UCR steelhead, (2) the new license would require measures to minimize effects from the construction and operation of the Project, and (3) the new license would require the applicant to consult with NMFS and other resource agencies and tribes during development of plans that would implement construction and operation of the Project.

The NMFS concurs with the Commission's determination and as a reasonable and prudent measure in the Incidental Take Statement for this opinion, requires that fish passage



facilities be constructed and operated at this Project. Please direct any questions you may have regarding this matter to Scott Carlon at (503) 231-2379, or Steve Morris at (503) 231-2224.

Sincerely,

A handwritten signature in dark ink, appearing to read "William Stelle, Jr.", is written over a light blue rectangular background.

William Stelle, Jr.
Regional Administrator

cc: Service List

Endangered Species Act - Section 7
Consultation

BIOLOGICAL OPINION

Enloe Hydroelectric Project,
Project No. 10536-Washington,
New License

Agency: Federal Energy Regulatory Commission

Consultation Conducted By: National Marine Fisheries Service,
Northwest Region

Date Issued: November 19, 1998

Refer to: OSB1998-0042

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I. Background

On May 30, 1991, the Okanogan Public Utility District No. 1 of Okanogan County, Washington (PUD), filed with the Federal Energy Regulatory Commission (Commission) an application for a new Federal license for the Enloe Dam Hydroelectric Project (Project No. 10536). The Enloe Dam Hydroelectric Project was constructed between 1916 and 1923 on the Similkameen River, a tributary to the Okanogan River, at river mile (RM) 9 approximately 3 miles northwest of Oroville in Okanogan County, Washington, and is currently owned by the PUD. The existing facility consists of a 276-foot-long, 54-foot-high concrete gravity arch dam; 50 surface acre reservoir with a gross storage capacity of 400-acre-feet; two 84-inch-diameter sluice gates; one 600-foot-long, 84-inch diameter wood stave penstock (one penstock has been removed); two steel surge towers; and a powerhouse (largely dismantled).

In August, 1996, the National Marine Fisheries Service (NMFS) completed its status review of steelhead populations in Washington, Idaho, Oregon, and California and identified 15 evolutionarily significant units¹ (ESU). On August 9, 1996 (61 FR 41541), NMFS proposed to list ten steelhead ESUs under Section 4 of the Endangered Species Act (ESA), 16 U.S.C. 1531 et seq., including a proposal to list the Upper Columbia River steelhead ESU as endangered. The geographic area occupied by this ESU includes the Columbia River basin upstream from the Snake River to Chief Joseph Dam (Yakima River excluded). Major subbasins include the Wenatchee, Entiat, Methow, and Okanogan Rivers.

On September 13, 1996, the Commission issued an order for a new license to the PUD for the Enloe Dam Hydroelectric Project. On October 11, 1996, NMFS submitted a motion for stay of the new license order until a more complete analysis of potential affects on UCR steelhead could be conducted and a conference pursuant to Section 7 (a)(4) of the ESA completed. The Commission issued an order for stay of the new license on November 14, 1996, and again on June 30, 1997. On August 18, 1997 (62 FR 43937), NMFS listed the UCR steelhead ESU as endangered. Only the anadromous form of *O. mykiss* was listed. The Wells hatchery summer steelhead stock is considered essential for recovery of this ESU and is included in this listing.

Subsequent to this listing the Commission, pursuant to Section 7 (a)(2) of the ESA, submitted to NMFS a May 7, 1998, letter requesting formal consultation for UCR steelhead on the issuance of a new Federal license. The May 7, 1998, letter was accompanied by a biological assessment (BA) and was received by NMFS on May 11, 1998.

The objective of this biological opinion is to determine whether issuance of a new Federal license for

¹For the purposes of conservation under the Endangered Species Act, an Evolutionarily Significant Unit (ESU) is a distinct population segment that is substantially reproductively isolated from other conspecific population units and represents an important component in the evolutionary legacy of the species (Waples 1991).

the Enloe Dam Hydroelectric Project (hereafter referred to as the Project) is likely to jeopardize the continued existence of UCR steelhead. While this opinion evaluates effects of the proposed action on UCR steelhead habitat, critical habitat has not been proposed or designated for this species. Therefore, conclusions regarding destruction or adverse modification of critical habitat are not included in this opinion.

II. Proposed Action²

The PUD proposes to renovate the existing Project for power production in a run-of-river mode. Renovation and Project features would include the following.

Dam

Little modification is proposed for the existing dam. The PUD would restore and update existing provisions for installation of 4-foot-high flashboards. The flashboards would typically be installed in mid-summer when flows dropped below 1,500 cubic feet per second (cfs) and removed early to middle spring when flows approached 1,500 cfs. On average, flashboards would not be in place between mid-April and July.

Intake

The existing sluice gates and operators would be replaced with new automated gates with electric or hydraulic operators and controls. There would be provisions for local and manual operation. The control systems would allow for local, remote, and automatic operation. A new 32-foot wide trash rack with an automated cleaner would be installed.

Downstream Passage Fish Screen

The proposed fish screen would be located downstream of the dam in line with the penstocks on the right bank. It would consist of a concrete structure approximately 205 feet long and 40 feet wide and contain hydraulic transition and guide walls, a sediment trap and gates, flat plate screens, and a bypass channel.

Conventional vertical aluminum perforated flat plate or stainless steel wedge wire screens are proposed. The hydraulic design would be for 800 cfs with an average approach velocity of 0.4 feet per second (fps). Total screen area would be between 2,300 and 2,600 square feet, depending on water depth. If perforated aluminum plate screens are used, it is proposed that the open area would be 40 percent with one-eighth-inch holes on one-quarter-inch centers. The length of the

²This section is taken largely from the BA and Section A of the PUD's License Application dated June, 1991.

screen would be roughly 125 feet with a normal depth of 18.5 feet. An automated cleaning system would be used to sweep debris downstream. The sweeping velocity would be maintained at roughly 2 fps. The screen structure would be enclosed and heated to guard against freezing and to reduce the accumulation of frazzle ice below the surface. Sediment traps would be placed in the approach channel and in front of the screens. Seven 30-inch-diameter sluice gates would be placed along the length of the approach channel to discharge trapped material back to the river.

The fish bypass channel would consist of an adjustable weir and inclined screen, a fish separator, collection box, and a 24-inch-diameter bypass pipe. The adjustable weir and incline screen would be used to maintain a consistent flow of roughly 20 cfs in the bypass pipe. The separator and collection box would allow for analyzing fish guidance efficiency and monitoring downstream movement of fish. Guided fish would be returned to the river below the falls.

Penstocks

The existing penstock would be reconditioned and repaired. A new 84-inch-diameter woodstave pipeline or a new steel pipeline would be constructed to replace the missing penstock. The existing steel surge towers and riveted high pressure penstocks between the surge towers and the powerhouse would be repaired as needed.

Flow Continuation

The steel penstocks between the surge towers and the powerhouse would be bifurcated with 60-inch-diameter steel pipe and fitted with automatic bypass valves that are hydraulically linked to the turbine wicket gates. This would allow for bypassing up to 700 cfs for normal or emergency powerhouse shutdown. Flow continuation would prevent surge and water hammer in the penstocks and rapid changes in river flow between the dam and the powerhouse. The bypass discharge would be below the water surface in a pool area adjacent to the powerhouse.

Powerhouse

The powerhouse structure would require considerable restoration. All electrical and mechanical systems would be replaced. If possible, the existing turbine cases and draft tubes would be reconditioned. Turbine runners, bearings, shafts, and wicket gate assemblies would be replaced. Generators, exciters, governors, switchgear, and controls would be replaced. Two new turbines would be installed with a hydraulic capacity of 400 cfs each. Total plant output would be approximately 4.1 megawatts with the flashboards in place and roughly 3.9 megawatts with the flashboards removed.

Tailrace Barrier

A bar rack barrier would be installed to prevent adult fish from entering the draft tubes. The barrier would consist of vertical bars with 1-inch clear spacing between bars. Tailrace flow would be guided by walls and adjustable baffles to distribute tailrace flow such that the approach velocity to the bar rack would be 1 fps.

Recreational Improvements

The PUD intends to provide improved recreational opportunities at the proposed project site. The current plan consists of (1) upgrading the existing north bank access road leading to the river access site; (2) providing barrier-free trail access to the river; (3) installing directional signing to inform the public of the river access site; and (4) providing a parking area, picnic tables, and a vault toilet at the river access site.

III. Biological Information and Critical Habitat

A. Biological Information

Between 65 and 81 percent of natural spawning UCR steelhead are likely derived from the Wells hatchery stock. The Wells Fish Hatchery, operated by the Washington Department of Fish and Wildlife (WDFW), was constructed in 1967 by the Douglas County PUD to mitigate for impacts caused by the construction and operation of Wells Dam on the Columbia River (RM 515). Steelhead produced at this facility were originally developed in the early 1960s from wild stocks destined for spawning areas above Priest Rapids Dam. The Wells stock was included in the listing because of its development from wild spawners and because natural replacement rates of UCR steelhead are low. This supplementation program was therefore determined to be essential for recovery of this ESU (Busby *et al.* 1996).

In general, adult summer steelhead enter the Columbia River from March through October. Adult UCR steelhead pass Wells Dam from late July through early November with peak passage occurring in September and October (Corps 1997, IEC Beak 1985). Steelhead enter the Okanogan River from mid-September through April and spawning occurs March through May. Spawning in the Similkameen River is limited to areas below Enloe Dam (lower 9 miles of the river). Juveniles typically emerge from the gravel between July and September and move downstream to overwintering habitat. Parrs generally rear between two and three years before migrating to the ocean but freshwater residence can range from one to seven years (Busby *et al.* 1996, MCHCP 1998). Additional background on biological information can be found in Busby, *et al.* (1996); *Federal Register* 61:41541, August 9, 1996; and *Federal Register* 62:43937, August 18, 1997.

B. Critical Habitat

Critical habitat is defined in 50 CFR Part 424 and means “(1) the specific areas within the geographical area currently occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a species at the time it is listed upon a determination by the Secretary that such areas are essential for the conservation of the species.” NMFS has not yet designated or proposed critical habitat for the UCR steelhead ESU. At the time of the listing proposal, the NMFS had not completed the analysis necessary to propose critical habitat. To avoid delaying the listing proposals, the NMFS stated its intent to propose critical habitat in a separate rulemaking for West Coast steelhead (61 FR 41559; August 9, 1996).

IV. Evaluating Proposed Actions

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 C.F.R. Part 402 (the consultation regulations). This analysis involves the following steps:

(1) Define the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline to the species' current status; (3) determine the effects of the proposed or continuing action on listed species; (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the environmental baseline and any cumulative effects, and considering measures for survival and recovery specific to other life stages; and (5) identify reasonable and prudent alternatives to a proposed or continuing action that is likely to jeopardize the continued existence of the listed species.

A. Biological Requirements

The first step in the method NMFS uses for applying the ESA standards of Section 7 (a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. For this consultation, NMFS finds that these biological requirements are best expressed as trends in population size and in terms of environmental factors that define properly functioning freshwater habitat necessary for survival and recovery of the ESU. Properly functioning watersheds, where all of the individual factors operate together to provide healthy aquatic ecosystems, are also necessary for the survival and recovery of UCR steelhead.

1. Population Size and Trends

Annual counts at Rock Island Dam from 1933-1959 averaged 2,600-3,700. A pre-fishery run size of 5,000 fish may have existed for tributaries above Rock Island Dam although runs during this period may have already been depressed by the lower Columbia River fishery (Busby *et al.* 1996, Chapman *et al.* 1994). Recent trends in the Wenatchee River show a 2.6 percent annual increase for the period

1962-1993 while there has been a 12 percent annual decrease in run size for the period 1982-1993 in the Methow and Okanogan Rivers combined. Wild steelhead counts at Priest Rapids Dam has declined from a 3-year average of 3,000 ending in the 1986/1987 run-year to 900 fish at present. Replacement ratios of naturally spawning fish are on the order of 0.3, meaning that for every naturally spawning fish only 0.3 adults are returning to spawn. This stock's inability to replace itself is the primary reason for the listing as endangered.

The UCR steelhead hatchery stock, which accounts for up to 81 percent of natural spawners in the Methow and Okanogan Basins, is relatively abundant and routinely exceeds hatchery program needs by a substantial margin. It is believed that if not for the hatchery stock, this ESU might not exist today. Nevertheless, even though the hatchery stock is a blend of indigenous stocks from this ESU, there still remains distinct genetic risks associated with hatchery supplementation (Busby *et al.* 1996).

2. Environmental Factors

The action area serves as a spawning, rearing, and migration corridor for UCR steelhead. The essential habitat features for these functions are : (1) Spawning gravel, (2) water quality, (3) water quantity, (4) water temperature, (5) food, (6) cover/shelter, (7) space, (9) access, and (10) safe passage conditions.

B. Environmental Baseline

The current rangewide status of UCR steelhead under the environmental baseline is described in Busby *et al.* (1996) and the final rule (62 FR 43937; August 18, 1997). A considerable amount of information regarding existing conditions in this ESU can be found in Exhibit D of the Mid-Columbia Habitat Conservation Plan (1998). Much of the following information is extracted from this document.

The construction of Grand Coulee Dam on the Columbia River (RM 597) in 1939 prevented anadromous fish from accessing over 1,100 miles of spawning, rearing and migratory habitat. In an attempt to preserve these stocks, the Grand Coulee Fish Maintenance Project was created. Anadromous fish, including UCR steelhead, were trapped at Rock Island Dam (RM 453) from 1939 through 1943 and randomly distributed to spawn in tributaries between the two dams or spawned in hatcheries and the progeny randomly distributed in these tributaries. Out of this developed the hatchery program that is in place today. Exactly how this has affected stock composition of UCR steelhead is unknown (Busby, *et al.* 1996).

Approximately 28 percent of the land base is in public ownership within the U.S. portion of the Okanogan Basin. Another 28 percent is owned by the Colville Confederated Tribes (CCT) and 44 percent is in private ownership. A sizeable chunk of the Okanogan Basin within the U.S. is rangeland (46 percent). Forest lands makes up about 44 percent, cropland roughly 6 percent, and the remaining 4 percent is in other uses (MCHCP 1998). About 58 percent of the commercial forests in public

ownership is managed by the Okanogan National Forest. The Bureau of Indian Affairs manages another 24 percent and WDNR manages roughly 16 percent.

There are several manmade barriers to upstream fish passage in the Okanogan Basin that have blocked access to habitat for decades. For example, Omak and Salmon Creeks, tributaries to the Okanogan River, both supported historical runs of UCR steelhead. Omak Creek lies completely within the Colville Reservation and the CCT is working with the National Resource Conservation Service to develop a watershed plan with the goal of restoring UCR steelhead to the system. An irrigation diversion was constructed on Salmon Creek (RM 3) in 1916 blocking access to historic habitat and dewatering the lower 3 miles of stream during the irrigation season. This condition persists today (MCHCP 1998).

The mainstem Okanogan River within the U.S. flows mostly through private agricultural lands. The stream banks lack adequate vegetation resulting in erosion and elevated water temperatures in the summer months. Heavy sedimentation has severely limited spawning habitat in this stream and high turbidity levels likely reduces feeding efficiency of juveniles (MCHCP 1998). This reach of river was likely more conducive to anadromous fish production before agriculture became prominent. UCR steelhead may have spawned and reared in the Okanogan River (Chapman *et al.* 1994). As recent as 1931 Native Americans constructed brush weirs across the river near Monse, Washington to capture adult anadromous fish (Bryant and Parkhurst 1950).

The Similkameen River drains approximately 3,840 square miles and supplies about 75 percent of average flows to the Okanogan River. About 80 percent (3,040 square miles) of the drainage area is located in Canada. Within the U.S., the mainstem Similkameen River flows through a mixture of private and public (Bureau of Land Management) lands. To the west lies the Loomis State Forest managed by the Washington Department of Natural Resources (WDNR) and the Okanogan National Forest managed by the U.S. Forest Service. Several leases with WDNR from private individuals for mining and prospecting exist along the beds and shorelines of the river (MCHCP 1998). It is thought that several drainages above Palmer Lake would be productive habitat for UCR steelhead (e.g. Toats Coulee, Sinlahekin and Cecil Creeks). Sinlahekin Creek currently provides spawning habitat for kokanee out of Palmer Lake and Toats Coulee Creek is a productive redband trout stream. However, no analysis of potential anadromous fish production has been conducted on these drainages (Linda Haufman, WDFW, pers. comm., November 3, 1998).

The habitat analysis conducted by IEC Beak (1985) estimated roughly 5.3 million square meters of spawning habitat was available in the Similkameen River basin above the Project. The largest portion of spawning area lies within the mainstem Similkameen River and the biggest section (38 percent) of mainstem spawning habitat occurs in British Columbia between Keremeos and Princeton. It was estimated that there was no spawning habitat between the Project and Palmer Creek and about 4.7 percent of the available mainstem spawning habitat occurred between Palmer Creek and Keremeos, British Columbia. However, the following qualification was included in IEC Beak's report.

“A qualification should be noted regarding the stream section between Palmer Creek and Keremeos. The field habitat sampling criteria used (average depth and velocity) may have seriously underestimated the total spawnable area present in this section. This section has the greatest concentration of spawning gravel of any part of the entire basin (over 2 million square meters). It has been estimated that perhaps as much as 542,000 square meters of additional spawnable area may exist in that section, and if true that would escalate the spawner capacity of the basin by an additional 50,500 adult fish.”

The total spawner capacity calculated for steelhead for the Similkameen Basin was 98,000 fish. It was estimated that the reach between Palmer Creek and Keremeos could support roughly 4,600 adult spawners. But as noted above, the potential appears to be much greater. Over 1.8 million square meters of juvenile rearing area exists in the Similkameen Basin. Most of the rearing areas were found in the same stream reaches as the spawning areas. Furthermore, it was estimated that there was an additional 98 miles of stream that was not inventoried thus the rearing area estimate was considered conservative (IEC Beak 1985).

The Similkameen River below the Project does provide spawning and over wintering habitat for UCR steelhead. Juvenile rearing during the summer months is limited by high water temperatures.

V. Analysis of Effects

A. Effects of Proposed Action

The December, 1992, Environmental Assessment (EA) and BA present an analysis of effects of the proposed project. Primary concerns are the effects of erosion control during construction; flashboard installation, emergency start-up and shut-down, and ramping rates; minimum flows in the bypass reach; dissolved gas levels; recreational impacts; and continued barring of access to habitat above the Project. In this Opinion, NMFS analyzes each of these potential sources of impacts in terms of whether it is likely to maintain or improve existing UCR steelhead population levels and the quantity and quality of their habitat in the lower Similkameen River to its confluence with the Okanogan River.

1. Erosion Control

The various erosion control measures described in the EA would minimize, but not eliminate, erosion caused by construction of the Project. The PUD would develop and implement an erosion control plan which would include controlling runoff with the use of diversions, drainage ditches, and sediment ponds; constructing during the dry season; and revegetating. Article 403 of the proposed license would require (1) a description of the actual site conditions; (2) measures proposed to control erosion, to prevent slope instability, and to minimize the quantity of sediment resulting from project construction and

operation; (3) detailed descriptions, functional design drawings, and specific topographic locations of all control measures; and (4) a specific implementation schedule and details for monitoring and maintenance programs for project construction and operation. In addition, Article 403 would require consultation with the affected resource agencies and tribes in development of the erosion control plan and requires approval by the Commission before any ground disturbing activities begin.

The Commission concludes in the BA that any erosion control measures implemented would not completely eliminate potential adverse effects. Suspended sediment would likely settle in large pools at the upper end of the canyon reach and possibly in spawning areas further downstream. The Commission also concludes that these potential impacts from would be short term and minimal. NMFS agrees that impacts from project construction would be short-term and minimal provided that all erosion control measures are properly maintained and that the monitoring requirements are strictly adhered to. There is some certainty involved with the development of the erosion control plans because permits would be required from the WDFW and the Army Corps of Engineers that would require erosion control and monitoring. The Hydraulic Project Approval (HPA) issued by WDFW would require strict monitoring measures to maintain erosion control devices and monitoring of suspended sediment levels in the stream below the Project. Furthermore, these permits would require that plans be in place for handling hazardous waste incase of spills.

2. Flashboard Installation, Project Shut-Down and Start-up, and Ramping Rates

Installation of flashboards across the crest of the dam, sudden changes in flow volume, or changes in flow schedules all could result in unscheduled ramping rates downstream. This could strand eggs and alevins in the gravel or small fry in shallow pools resulting in mortality of UCR steelhead. NMFS is not aware of any specific mitigation measures to address these issues. Articles 410 (flashboard installation plan), 411 (flow continuation plan), 412 and 413 (ramping rate plan) of the proposed license would require consultation with the affected agencies and tribes during development of these plans.

3. Bypass Reach Minimum Flows

Proposed project operations would reduce flows in the 800-foot bypass reach between the dam and the powerhouse while the flashboards are out and would eliminate flow after they are installed. This has the potential of impacting water quality by reducing dissolved oxygen levels and elevating water temperature in the pool between Enloe Falls and the powerhouse. Maintaining good water quality in this reach vital for adult and juvenile steelhead that may hold in the pool. To mitigate potential adverse effects, proposed license Article 405 would require minimum bypass flows of 35 cubic feet per second (cfs) between June 1 and June 30, 40 cfs between July 1 and August 31, and 20 cfs between September 1 and May 31. Furthermore, Article 405 would require that 40 cfs be released in the

bypass reach when water temperatures reach or exceed 65 degrees Fahrenheit. Moreover, Article 408 would require that a monitoring plan be developed, in consultation with the affected agencies and tribes, to ensure that water temperature in the bypass reach does not exceed 65 degrees Fahrenheit, dissolved oxygen does not drop below 8.0 milligrams per liter, and that total dissolved gas (TDG) saturation does not exceed 110 percent.

4. Total Dissolved Gas Saturation

The Similkameen River is classified as a Class A stream by the state of Washington. As such, the water quality standard for TDG requires that it not exceed 110 percent. Water is supersaturated when the total pressure of dissolved gases is greater than the barometric pressure at the water surface. The incidence of gas bubble disease in fish is modified by fish size, water depth, temperature, and O₂/N₂ ratio (Alderdice and Jensen 1985, Jensen 1988). Alderdice and Jensen (1985) found that the hydrostatic pressure within the egg capsule provides a buffer against supersaturation of atmospheric gases; and suggested that embryos may suffer chronic effects when TDG saturation is 111-116 percent, and suffer acute effects at 117-122 percent saturation. Nebeker *et al.* (1978) suggested that egg-embryo development is not affected by saturation levels of 126 percent.

Salmonids, including steelhead, appear to be most susceptible to TDG supersaturation during emergence. Studies generally suggest that after 30 days of exposure, chronic effects begin to occur at 105-110 percent TDG saturation and acute effects begin to occur at 110 percent TDG saturation (Dawley and Ebel 1975, Alderdice and Jensen 1985, Jensen 1988). Furthermore, Dawley and Ebel (1975) found that exposure to TDG levels of 110 percent significantly affected growth and blood chemistry of steelhead.

The 1991 License Application addresses dissolved gas in terms of dissolved oxygen (DO) concentrations and percent saturation. It does not provide information regarding Project effects specific to TDG in the lower Similkameen River, except to state that problems from gas bubble disease have not been observed (page E2-37). An April 22, 1993, memorandum from Bruce Ault, WDFW, to Tami Black, WDFW, contains figures for TDG saturation during the spring months from 1991-1993. Most of the measurements were taken in April of 1991. On April 16, 1991, TDG saturation above the Project was 102.58 percent and 110.33 percent below the project. On April 30 and May 9, 1991, TDG saturation was measured at 110.32 and 111.02, respectively, at the Similkameen ponds roughly 3 miles below the Project. Juvenile fish reared at the Similkameen ponds were experiencing chronic levels of stress resulting in disease outbreaks. Since installation of devices to reduce TDG in the water entering the ponds, problems with disease have greatly reduced (February 18, 1997, Memorandum from Bob Heinith, CRITFC, to Scott Carlon, NMFS).

While the river downstream of the dam may experience supersaturated levels of TDG during any time water is spilled over the crest of the dam, impacts would most likely occur during period of high run-off

in the Spring. It is during this time that steelhead eggs would be in the gravel. Some swim-up may occur prior to installation of flashboards. Impacts on steelhead eggs may be ameliorated by their resistance to supersaturated water. Mortality and sublethal effects are likely to occur in some years on fry and juvenile steelhead.

5. River Access for Recreationists

Article 420 requires the PUD to submit a recreation enhancement plan that implements the PUD's proposed improvements (described above in section II). In addition, Article 421 would require the PUD to submit a plan that would provide for (1) an interpretive display explaining the hydropower project; (2) a parking area located on the north bank of the railroad bridge, off the Loomis-Oroville Road; (3) appropriate signs to inform the public of this opportunity; and (4) provide spur trails to the river. This proposed license Article requires that the PUD develop this plan in consultation with the affected agencies and tribes. Some potential effects from enhanced recreational opportunities are reduced water quality from parking lot run off, increased sediment inputs from trails, and incidental harassment of UCR steelhead.

6. Fish Passage

There has been considerable discussion and debate through the years whether anadromous fish ever ascended Enloe Falls. Even the height of the falls has been debated but is generally considered to be 15 to 20 feet. Fulton (1970) suggests that UCR steelhead did occur above Enloe Falls but Chapman *et al.* (1994) found no conclusive evidence that adult steelhead ever ascended the falls. Several Affidavits were taken in 1942 from local citizens regarding their knowledge of anadromous fish occurrence in the Okanogan and Similkameen Basins. Of particular interest is the testimony regarding passage over Enloe Falls at RM 9, roughly 300 feet downstream of Enloe Dam. Some testimonies stated that "salmon" never ascended the "falls of the Similkameen" (we assume the "falls of the Similkameen" to mean Enloe Falls). Others testified specifically to having no knowledge that anadromous fish ascended the "falls of the Similkameen where the power dam is now located." Yet others testified to having observed chinook salmon "in the sloughs at the lower end of Palmer Lake." While the historic record is inconclusive, it is plausible that UCR steelhead may have occurred above Enloe Falls historically. Under the certain hydraulic conditions, anadromous fish, particularly steelhead because of their strong leaping capability, have ascended falls greater than 20 feet (e.g. Willamette Falls in Oregon and Celilo Falls on the Columbia River before inundation by the Dalles Dam). However, the presence of the Project precludes any fish from accessing habitat above the falls.

B. Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower

systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. In addition, non-Federal actions that require authorization under section 10 of the ESA will be evaluated in section 7 consultations. Therefore, these actions are not considered cumulative to the proposed action. In addition, NMFS is unaware of future non-federal activities in the action area which would alter the environmental baseline.

VI. Conclusion

The Commission concluded that the proposed issuance of a new license for the Project would not jeopardize the continued existence of UCR steelhead. The Commission based this determination on (1) the new license would ensure that the Project is compatible with any future plans to provide fish passage thus contributing to the enhancement and recovery of UCR steelhead, (2) the new license would require measures to minimize effects from the construction and operation of the Project, and (3) the new license would require the applicant to consult with NMFS and other resource agencies and tribes during development of plans that would implement construction and operation of the Project.

The NMFS agrees with the Commission's determination that issuance of a new license for the Enloe Hydroelectric Project is not likely to jeopardize the continued existence of UCR steelhead. Our conclusion is based on the following.

A. Non-Passage Issues

Erosion Control: We expect that the erosion control measures and monitoring requirements as set forth in standard Federal and state permits for construction activities would minimize potential impacts resulting from erosion and subsequent sedimentation in the Similkameen River below the Project.

Flashboard Installation, Project Start-Up and Shut-Down, and Ramping Rates: The proposed license articles that require the necessary consultation with the agencies and tribes should ensure that appropriate design and monitoring is established in the subject plans. However, NMFS cannot predict the outcome of future consultations with the PUD. Therefore, to ensure that potential effects are minimized or eliminated, NMFS will require in its Incidental Take Statement mandatory terms and conditions that these plans satisfy NMFS before approval is granted by the Commission.

Bypass Reach Minimum Flows: We agree that the minimum flow requirements for the bypass reach should be adequate to protect UCR steelhead. Furthermore, the PUD would have to submit a monitoring plan after consultation with the agencies and tribes. NMFS cannot, however, predict the outcome of plan development for monitoring requirements under Article 408. The PUD may be able to exert some influence on temperatures in the bypass reach by increasing flow when necessary. The PUD would be able to maintain dissolved oxygen in the bypass reach at 8.0 milligrams per liter or higher by spilling water over the dam or by some other means. NMFS will require in its Incidental

Take Statement mandatory terms and conditions that monitoring plans developed under Article 408 satisfy NMFS before being approved by the Commission.

Total Dissolved Gas: UCR steelhead would likely be adversely affected by TDG supersaturation resulting from spill over the crest of the dam. Supersaturation of atmospheric air can be significantly reduced by installing structures to prevent the water from plunging to depths that force atmospheric gas into solution. The Commission concludes in its BA that significant adverse effects would be unlikely to occur because license Article 408 would require the PUD to consult with the agencies and tribes to monitor TDG and ensure that saturation does not exceed 110 percent. As stated previously, NMFS cannot predict the outcome of plan development for monitoring requirements under Article 408. However, steelhead eggs are very resistant to high levels of TDG. In most years, fry would emerge from the gravel during period when most or all of the flow would be routed through the powerhouse and not spilled over the dam. Therefore, we do not believe that effects from TDG supersaturation are significant to the point that the continued existence of UCR steelhead would be jeopardized.

River Access for Recreationists: To ensure that potential impacts on UCR steelhead resulting from construction and operation of river access facilities are minimized and properly maintained, NMFS will require in its Incidental Take Statement mandatory terms and conditions that plans under proposed license Articles 420 and 421 satisfy NMFS before being approved by the Commission.

B. Fish Passage

As fully set out in NMFS' comments, recommendations, fishway prescriptions and conditions, dated June 1, 1992, passage of anadromous fish has been a central issue in virtually all proceedings for this Project. In 1950, the U.S. Department of Interior and the Washington Department of Fisheries recommended fish passage as a license requirement. In 1956, the Federal Power Commission issued a license for Project No. 2062 (i.e. Enloe Dam) containing Article 26, which required fish passage.

In 1976, Congress passed the Oroville-Tonasket Unit Extension Legislation. This authorized the Secretary of the Interior, through the Bureau of Reclamation (BOR), to undertake measures necessary to provide fish passage and propagation on the Similkameen River. Congress also authorized the appropriation of approximately \$40 million for work on the Oroville-Tonasket Irrigation Unit. This work included provision of access to potential spawning and rearing areas above the Project through dam removal or the installation of fish ladders. In 1977, the BOR determined that the preferred method for accomplishing the fish enhancement goal of the 1976 legislation would be to remove the Project.

In 1983, the Commission issued a license for Project No. 2062 providing for the "...alteration of project structures and operations..." to accommodate fish passage measures included in the Northwest Power Planning Council's (NPPC) Columbia River Basin Fish and Wildlife Program. The Commission rescinded this order in 1986 citing unresolved passage considerations.

The NMFS agrees with the Commission's conclusion that the provision for fish passage would provide for enhancement and recovery of UCR steelhead. Based on IEC Beaks analysis of spawning and rearing habitat (see section IV. B.), there exists a tremendous potential for natural production of UCR steelhead above the Project. Most of the available habitat within the UCR steelhead ESU is under seeded. The Wells hatchery stock has experienced a surplus of steelhead gametes in past years and roughly 300,000 juvenile steelhead were produced above production goals this year. It is likely that juveniles from the Wells hatchery program would be available for seeding habitat above the Project in future years.

For nearly the last 50 years, this Project's record demonstrates that Columbia Basin resource managers have supported passage at the Project as a means of enhancing depressed stocks of anadromous fish. NMFS has consistently supported passage measures for this Project. The listing of UCR steelhead as endangered underscores the need for implementing measures that promote enhancement and recovery of this stock. NMFS cannot assume that mainstem Columbia River dams within the UCR steelhead ESU would be removed in the near future; or that water withdrawals, recreation, and other development will significantly decrease. Certainly, the PUD should not be solely responsible for mitigating impacts resulting from Columbia River dams and other resource users. Indeed, Federal, state, and other private entities are exerting considerable effort to recover severely depressed stocks of anadromous fish. Nevertheless, an authorization for continued operation of the Project without fish passage facilities would have the affect of foreclosing the timely implementation of reasonable measures that provide for recovery of UCR steelhead. Therefore, NMFS concludes in this opinion that construction and operation of fish passage facilities should be required at this Project. Fish passage is necessary both as a means for restoring access to historic habitat for enhancement of UCR steelhead, and as a means to avoid foreclosing reasonable and prudent measures for recovering the listed species.

VII. Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or to develop additional information.

The Mid-Columbia Habitat Conservation Plan developed by Chelan County Public Utility District contains provisions for funding future habitat and hatchery enhancements as a means for mitigating impacts from its project operations. We recommend that the PUD consult with NMFS and other Federal, state, tribes and Chelan County Public Utility District regarding the potential for assisting the PUD with funding construction and operation of fish passage facilities at the project.

VIII. Reinitiation of Consultation

Consultation must be reinitiated if: the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

IX. References

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X. Incidental Take Statement

Sections 4 (d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary; they must be implemented by the action agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Commission has a continuing duty to regulate the activity covered in this incidental take statement. If the Commission (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

A. Amount or Extent of the Take

The proposed action, as modified by the reasonable and prudent measures and terms and conditions, is expected to result in minimal incidental take of UCR steelhead. NMFS expects that incidental take could result from suspension of sediments from construction activities, high levels of dissolved gas during spring runoff, and handling of UCR steelhead during trap and haul operations. NMFS expects that incidental take would be minimized by requiring the following reasonable and prudent measures and mandatory terms and conditions. The best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species itself. In instances such as these, the NMFS designates the expected level of take as "unquantifiable." Therefore, even though NMFS expects some level of incidental take to occur due to the action covered by this opinion, NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this opinion.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measure(s) are necessary and appropriate to minimizing take of UCR steelhead:

1. Future plans developed by the PUD pursuant to proposed new license Articles 403, 405, 408, 410, 411, 412, 413, 420, and 421 shall require consultation with NMFS and must satisfy NMFS before the Commission approves final plans for implementation by the PUD.
2. The Commission shall include a license Article that requires the construction and operation of upstream and downstream fish passage facilities at the Project. Upstream passage shall be accomplished with a ladder-type facility.

In its June 1, 1992, Comments, Recommendations, Fishway Prescription and Conditions, NMFS prescribed upstream and downstream fish passage facilities pursuant to Section 18 of the Federal Power Act. The upstream passage facility prescribed was a trap and haul type facility. This type of facility would provide fishery managers with a means of controlling and monitoring fish entering the trap. However, problems associated with a trap and haul facility include (1) measurable increases of stress on fish due to handling and delay, (2) precludes volitional migration over the Project, (3) does not provide a pathway for fish to migrate back downstream should they wish to do so, and (4) requires that personnel be present at the site for passage to occur at all. The NMFS believes that when technically and biologically feasible, it is prudent to provide upstream passage with a ladder facility. A ladder-type facility would essentially eliminate complications associated with trap and haul facilities.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Commission must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

- 1a. Article 403 shall require NMFS approval of erosion control plans and monitoring of the effectiveness of the measures implemented before ground disturbing activities can begin.
- 1b. Article 405, 408, 410, 411, 412, 413, 420, and 421 shall require NMFS approval before Project operations commence.
- 1c. The Commission shall include a license Article that requires the PUD to consult with NMFS and other Federal and state agencies and tribes to determine if project modifications are necessary to reduce TDG supersaturation.

- 2a. The Commission shall require the PUD to initiate consultation with NMFS, no later than 180 days after the Commission issues its final order for the new license, to complete designs of the prescribed downstream passage facility.
- 2b. The Commission shall require the PUD to initiate consultation with NMFS, no later than 180 days after the Commission issues its final order for the new license, to continue development of a ladder-type fishway design for the Project.
- 2c. The Commission shall require the PUD to initiate consultation with NMFS, no later than 180 days after the Commission issues its final order for the new license, to continue finalize design of a tailrace barrier.